

NPS Climate Change Scenario Planning (CCSP) Workshop

Anchorage, Alaska

22-25 February 2011

Coastal Group

Nested Scenario 1: PB&J/Riots and Revolution: “Jellyfish Jamboree, Fishing Fiasco”

The Narrative:

A phone conversation between Danny and his grandfather

--Hey Grandpa! How's it going?

--Oh, hi Danny. I miss you! How's life in Anchorage?

--Pretty good... I miss being able to go fishing with you, though -- even if we usually got nothing but jellyfish. Mom and Dad are just happy they have jobs again. I guess people still need interpretive rangers and port workers here.

--It was different twenty years ago, Danny. The fishing... well, you wouldn't believe how good the salmon fishing used to be. There were tons of mussels, and crabs, oysters, clams... you name it. Lots of visitors used to come to see the animals that fed on those fish, too.

--Yeah, that's what you always tell me. Mom and Dad say they used to see bears all the time, and tons of birds, and seals and otters and stuff. How come no one did anything about it when all those animals started to disappear?

--Well... it's hard to explain. We knew it was happening, but it was pretty tough to get the people with the power to do anything about it. They just weren't organized. There was a lot of arguing between the Council, and the Parks people, and the Fish and Wildlife people -- all of those government folks. Some of them wanted to help, but they had no funding, and no plan. In the village, folks got depressed when they couldn't go fishing any more, and they felt like they just couldn't maintain their way of life.

--What about you, Grandpa? You're not depressed, are you? You should have moved to Anchorage with us!

--No, no, Danny. I'll stay here. I can't be a fisherman anymore, but there are still a few caribou worth hunting, and there might be a fish farm starting up. Maybe I could work there. Or maybe I can get an

interview with that new oil and gas exploration company that is supposed to be moving into town soon. If the government isn't going to help us, we just have to help ourselves, I guess.

Nested Scenario 2: Acid Wash/Big Problems, Big Efforts: "Acid Reflex"

The Narratives:

#1: A text chat between Anna and her boyfriend

Background:

This world in 2030: Steadily declining benthic community has led to loss of charismatic iconic megafauna and a drastic food web shift. Similar to a boom/bust economy, the bottom has dropped out of the fisheries industries as well as tourism. Small towns dependent on these resources, including subsistence communities, are facing major economic challenges. Frequent pummeling from intense storms has wreaked havoc on infrastructure. Concerned communities are coming together with institutions in a concentrated effort to creatively problem-solve the enormous issues they are facing.

Major impacts: Absent and altered fish communities create a ripple effect from subsistence users to birds and mammals. Increased storm surges impact productivity of waterfowl and cause dramatic coastal erosion. Density dependent diseases (prevalence and/or severity of outbreaks), pose greater risks to species survival. Access to roads and trails becomes difficult.

Issues facing management: Subsistence communities asking for introduction of surrogate species and/or increased harvest of remaining species. Agencies are no longer able to meet their mandate of protecting certain species so they are facing a re-working of mission. Utilizing available funding becomes a problem of rapid prioritization and implementation. Interagency plus robust public/private sector integration in the form of a problem-solving task-force aka "ecosystem cooperative". Media and public "support" proves to be overwhelming at times. Increased pressure for natural resource development and activities to replace those lost... managers have to address user conflicts. Marine spatial planning becomes a necessity.



2: The twentieth annual meeting of the Southwest Alaska Collaborative Planning Team

Michael:

Good morning, and welcome everyone, to the twentieth annual meeting of the Southwest Alaska Collaborative Planning Team. Just to remind you, today we have the special privilege of having not only many interested Alaskans and several members of the press covering the event, but also two members of our state legislature toggled in via multi-media holo-screenplex to hear our needs and concerns -- welcome, Nace Ayer and Cash Baggs -- and our very own Alaska State Legislator, Newt Eymes.

As most of you know, my name is Michael Shepherd. I'm honored to be hosting this event. I've been part of this process from the start, and in the past 20 years with the Park Service I've really earned all these gray hairs. We've seen a lot of changes in two decades, as we've struggled to adjust to the acidification of our coastal waters and the heavy rain and storms that have been pummeling our coastline, and although we've put in a lot of work during that time, there's still a lot to be done.

With that, let's have a quick round of introductions. Let us know who you are, and just a few sentences about why you're joining us here today. If we could start with our honored guests?

Bud

I'm Representative Newt Eymes, and I'm happy to report that I'm working on a bill that would help coastal communities all over the US, and particularly here in Alaska. I'd like to know how Congress can help aid your communities in the shift away from salmon fisheries -- which I know are steeply declining -- as the basis for both your subsistence economies and your cash economies. We're working to help you create new sources of jobs and revenue such as your wind farm -- which I hear has been cranking out the power -- and your new hydro plants. We're also hoping to help out in your new agricultural sector (I sure do love a good rhubarb pie).

Chuck

Nace Ayer here. I'm working for you guys down here in Juneau, and let me tell you, those of us in the legislature aren't going to want to hear a lot of sob stories and funding requests. All I hear from your area is complaints: "The salmon are declining, the shellfish are dying off, our historic sites have washed out, the glaciers aren't where they used to be, we have flooding and erosion and the park visitors aren't coming any more." You guys have been doing a lot of planning and a lot of science-y research-y stuff for twenty years, working with those university folks, the co-management people, the Feds, and even the greenies. We want to know where it's gotten you.

Fritz

Hi there, glad to be toggled in. I'm Cash Baggs. If I could beg to differ with my colleague Nace, I've already been hearing good things about your progress -- for example, the green energy initiative in which the Park Service shares all the newest conservation innovations with neighboring

communities, and has hooked six villages into the zero-carbon grid. I think there are plenty of projects that the folks down here in Juneau would be interested in, during our upcoming budget cycle.

Michael

Thank you. And now let's hear from our team members. We have a few here in the room, and others toggled in. Perhaps you could each let us know a bit about what working groups and projects you've been involved in, and what you're hoping to see accomplished in the coming year?

Brooke

Thanks Michael. I'm Annie Molls, director of the Charismatic Megafauna Tour Company. Well, we've had some tough times with all the rainy weather, and we've had to cancel our Cute Critters tour – there just aren't frequent enough viewings of sea otters and seals to keep the visitors happy. But the new moveable floating dock that NPS put in is great – totally storm-proof. It means that we can still get our boats out for our ocean tours. We're planning a new one called See Jellyfish Before You Die. We could really use some help from the agency folks in helping bolster that with your education and interpretation programs. We'd also looking forward to the report from the interagency monitoring team and the researchers from UA about what species are coming in, and what is likely to show up in the next few years, so we can gear our new tours towards those species.

Bill

Good morning. I'm Bill Ding, from NPS. I've been working on the new infrastructure developments at the Park – the moveable glacier kiosks, the floating dock, the foldable signs. I want to hear how those are working out for our visitors and for our partners in the tourism industry. We've got some ideas for ways to keep our bridges and roads from washing out, but we may need some funding to make that happen, so I'm glad to have our representatives toggled on. [Even you, Nace Ayer]

Sue

My name is Olive Ryteer, and I'm from the village of Pertinent. We've appreciated the help we've been getting from the new green energy plan, and the cooperative management agreement is really helping, but we still feel like our way of life is slipping away from us. The salmon fishing has been terrible for years now, and the caribou hunting is no good either. Folks are getting depressed, and that leads to all kinds of troubles. We're worried that if more folks move away, we may lose our school. We'd like to see more help finding us jobs, and more information on new ways to maintain our subsistence lifestyle.

Anna

Hi there. I'm Anna Collagist, from the University of Alaska. I've been part of the interagency monitoring team. With a gaggle of grad students slaving away in partnership with the folks from NPS, USFWS, and NOAA, we've been doing near-shore and offshore surveys of fish, shellfish, and bird populations, as well as assessing ocean pH and availability of food sources at all trophic levels. I'll be presenting some results that I think will be interesting to you, Annie. It looks like a major trophic shift is

going on, and if you can point out some new species as well as some old species to your visitors, you could create a brand new Watch Climate Change As it Happens tour.

Nancy

Hi, I'm Raina Snow from the University of Alaska. I've been working with all my agency, business, and non-profit colleagues from the Climate Working Group to improve our climate modeling techniques, and to try to get a handle on what we can expect from the PDO, ENSO, and all the other acronyms.

Michael

Thank you, planning team. Well, it sounds like we have our work cut out for us, so let's get going on today's work session!

Nested Scenario 3: Low Grade Fever (Cold PDO), Is Anyone Out There: "Is There a Doctor in the House?"

The Narratives:

#1: Low-grade Fever

Low magnitude change (minimal increases in ocean acidity, precipitation and storm activity, and temperature; temperature increase ameliorated by cool-phase PDO, yet still measurable; temperature effects drive biological and physical responses) was addressed within an environment of low public concern and low institutional commitment

Ocean acidification and increased precipitation and storm activity are primary drivers. Temperature continues to rise at a rate of approximately +2 °C over the next half century. A cool-phase (-) PDO is in effect until approximately 2030, at which time a shift to warmer, drier (+PDO) conditions is expected. The increase in mean annual temperature has been ameliorated by the cool-phase (-) PDO.

Summer and winter temperatures have been \leq average over the past 20 years. Precipitation has been highly variable, with a few years of above-average snowfall and other years characterized by cold, dry conditions. Rates of glacial recession have decreased (e.g., at the termini), but thinning continues. Relatively low rates of change (temperature) and high variability (precipitation) result in barely perceptible climatic changes in southwest AK; i.e., climate conditions seem to be relatively stable.

Public perceptions of climate change are as follows: (1) Changes are slight enough to be perceived by the public as benign or even positive; (2) there is low media coverage of climate change, at least in southwest AK, due to lack of dramatic environmental changes, and this contributes to public complacency. Given the lack of change, those who question climate change gain credibility. There is little public pressure on

politicians to deal with climate change issues in SW Alaska, and there have been no climate-related emergencies. Conditions remain stable, familiar.

Because of this perceived lack of change, climate change funding has dried up, at least for southern AK. There is still concern within the agencies about the effects of climate, particularly following the imminent shift in PDO (- to +); however, convincing the public that climate effects may be serious has become increasingly difficult. Large increases in temperature may be evident at higher latitudes, in contrast to the more subtle changes occurring in southwest AK, and thus may divert political and economic support away from SW AK. Meanwhile, the US carbon footprint (GHGs) has increased, although there has been some progress in clean/alternative energy, including increased reliance on natural gas. An aging population has put increasing pressure on the economy, and the national debt, health care, social security and other funding priorities have superseded climate change in terms of importance in the public view. Agency programs, including climate change funding, have been cut.

Major impacts on the bioregion include increased shrub cover; increased biomass, including woody biomass, and increased C uptake and sequestration. There are potential increases in drought stress in upland vegetation, including forests, as well as continued insect damage and/or forest dieback. However, ecosystem changes have been incremental, and mostly related to succession. A cool-phase PDO may result in reduced salmon runs, but potentially increased productivity in shellfish (shrimp/crab). Moose may benefit from increased shrub cover (willow cover), whereas caribou habitat will decline. With increased warming and lower snowpack depths at low elevations, deer may expand into new habitat. Sea lion and harbor seal populations, which may have bottomed out by 2010-2020 may see a slow recovery going into 2030. While fisheries resources diminish elsewhere in the world, the AK fishery (SW Alaska) becomes ever more valuable.

Management issues are driven in part by public perception. Convincing the public of the likelihood of sudden warming associated with a shift to warm-phase (+) PDO remains difficult. Agencies are faced with a lack of funding to educate public and/or adapt to or mitigate change. Agency mandates make rapid response to climate-related issues unlikely/difficult, and there is little impetus for a change in agency structure. Pressures from external communities are relatively low, but still some predator control issues remain. A variable environment (e.g., variable snowpack & freeze dates) results in an uncertain regulatory climate. Shifts in the timing of hunting season are needed annually, and yet there is resistance on the part of the leadership (agency) to remain responsive. The baseline that agencies rely on to set hunting seasons is highly variable, all over the map. Some interagency coordination exists at the landscape level (LCCs), although NPS will have some of the last habitat that will support species that are losing out to climate. As a result, NPS will be asked/expected to act as a biodiversity reserve. Biological stresses (e.g., drought stress, forest dieback, increasing fuel loads) and pressure from land managers and clients to mitigate these

stresses will drive management decisions. Competition for resources continues among subsistence, sport, and commercial harvest users.

Other areas of AK may have changed more than southwest; focus on climate change may be on Arctic/Interior, and SW AK may be lost in the shadows. As a result, some resources previously allocated to climate change adaptation/mitigation in SW Alaska may be reallocated to the Arctic/Interior. These factors lead to a shift in priorities at the regional and national levels, and eroding budgets (no budget increases)

#2: The Doctor's Slide Show

Dr. Deunough Harm, a retired physician, adjusts the focus on the image of the massive brown bear he photographed in Katmai last summer. It takes up the entire screen. He is addressing a group of his friends and colleagues, most of them who have spent their careers in the biological sciences, at an informal gathering in his home in Annapolis, MD. He spent two weeks traveling in southwest Alaska last August, fitting in a glacier tour (KEFJ), a bear-viewing trip to Brooks Camp (KATM), and a trout-fishing trip in LACL. He visited southwest Alaska because he views it as one of the few relatively intact, biologically diverse ecosystems remaining in 2030, and he avoided a visit to Denali and other Interior and Arctic locations in Alaska because fires and smoke make these places miserable and unhealthy. The message he heard repeatedly from park interpreters, however, was one of impending, and potentially very significant, environmental change. Here is an excerpt from his travelogue:

‘We went on one of those glacier tours, and the glaciers were spectacular. We didn’t see many calving glaciers, apparently because most of the tidewater glaciers have receded onto land in the last several decades. The park rangers talked a lot about climate change, but when you see the size of these glaciers with your own eyes, it’s hard to believe the bleak predictions. In fact, the ranger admitted that one of the glaciers we saw had advanced some in the last couple of years. I didn’t really understand why a glacier could be increasing in size if the world’s in climate change crisis.’

‘We ate seafood, mostly salmon, almost every night, but it was more expensive than I’d expected. I thought being this close to the source would make it cheaper, but I guess that wild fish is expensive, no matter where you go. It was a lot better than the farmed stuff we eat here, and we were on vacation, after all.’

‘Speaking of fish, the bears didn’t seem to be having any problems, although the ranger at Brooks Camp said that there were fewer bears now than when the salmon runs were really big. I was glad that we reserved our bear viewing trip ahead of time. I saw people getting turned away, since many of the tours were sold out. We flew to a beach in Katmai from Homer and watched bears digging for clams in the mudflats. Our guide

said that if the ocean continues to acidify, the bears and other wildlife may have trouble finding clams in the future. Our pilot was a native guy who said he had moved his family to Homer because it was too expensive to live in the village anymore.'

'If the park rangers and guide are right, I suggest that everyone visit Alaska soon. They say the kind of big changes we're already seeing on the eastern seaboard, like the breakup of Assateague Island into Assateague Archipelago, will be hitting Alaska soon due to a shift in the PDO.'

His friend, Dr. C. N. Salmon, a retired fisheries biologist from Seattle, leaned forward. 'Are you talking about the Pacific Decadal Oscillation? We used to see strong salmon runs in warm-PDO years in Alaska. Nobody really knows what causes the PDO, but it tends to run on 20 to 30 year cycles. If they're expecting a shift from cool- to warm-phase PDO conditions, that change alone could really strengthen the already low-level warming that everyone else is dealing with. I would expect that the glaciers in southern Alaska will start receding rapidly again!'

(From a societal impacts perspective, recognition of PDO is important because it shows that "normal" climate conditions can vary over time periods comparable to the length of a human's career or generation.)

Riverine Group

Nested Scenario 1: Smokey/Wheel Spinning

The Narrative:

An Ecologist's 30-Year Perspective

The day started off like so many in the past, checking the weather and prepping equipment. The winds were finally favorable for a day on the lake. As we motored outside of Hardenburg Bay, a smoky haze obscured the mountain tops to the west and a fourth fire of the season. I wondered if I'd ever see the mountain tops before field season ended. As we boated up towards the head of Lake Clark I looked south at Tanalian Mountain and noted the brown patches appeared larger this summer compared to last year. I recall my first trips to Lake Clark and observing a green jungle of alder dominating the lower mountains. Now stem rust, a new disease to Alaskan flora, is wiping out large patches of alder. "At least that green wave stopped spreading up the mountain side," I remarked to my crew mate. Down low next to the lake the birch displayed a hint of autumn already. We were a good two months away from peak autumn colors but the signs of drought stress were obvious.

After a half hour boat ride we reached our first sampling site at the head of the lake. The upper lake is unusually quiet these days. I remarked how years ago the sound of rushing water would drown out one's thoughts as waterfalls cascaded off the mountains. But with the glaciers gone up top, the waterfalls are a mere trickle of their former self. Another slurry bomber passed high overhead. As we started our sampling sequence I lowered a Secchi disc over the side of the boat to check water clarity. "Ten meters" I called out. "Definitely not the turbid waters I remember earlier in my career," I thought. The Tlikakila River, once the primary source of glacial water flowing into Lake Clark, now runs crystal clear and the upper lake resembles the deep blue waters of Kijik Lake. Taking away a watershed's glaciers is like putting a tourniquet on the river. Greatly reduced flows and sediment loads down this Wild River have reduced a once braided network of constantly shifting river channels into a single canal wadeable throughout most of summer. The once vast river delta that was such an obstacle for boaters in my younger days is now stabilized and overgrown by the forest of 15' spruce and birch.

Not long into our second sampling site the day's first boat load of anglers passed by making their way to the Tlikakila. The clear stable waters now support a popular rainbow trout fishery. No one in their right mind would have fished that river twenty years ago. After completing our sampling we decided to make our way up to the old river delta and take a quick count of the sockeye salmon staging along the lakeshore. As we strolled down the beach schools of sockeye stirred about, most fish were crimson red with a few blush fish mixed in. In 2007 I visited my first fish camp just down river from Nondalton. Back then the sockeye run was peaking in the Newhalen River around July 20th. But from the looks of these fish most have been here at least a month already. Now four guide boats were beached just up the shoreline. Lake Clark—a rainbow trout destination, it was starting to look like some of the more popular Katmai fisheries of yesteryear. I recall when guides departed Port Alsworth via float plane early each morning, transporting clients to fish the rainbow trout waters around Lake Iliamna. Now they sleep in and take a boat ride up-lake. We stopped and talked with one of the guides. I wanted to know if he had spotted any sockeye spawning activity upriver. "We're a week or two early," he remarked. The greatly diminished flows and clear waters of the Tlikakila River sure made it easier for bears to fish. It used to be the Tlikakila River held the latest spawning population of sockeye salmon in Bristol Bay with peak spawning activity occurring in October, sometimes into November, after the glaciers stopped melting and the river cleared up. It was the best area to find a heavy concentration of brown bears late into the fall as they took advantage of a reliable food source just before hibernation. But now the Tlikakila sockeye are just like any other population in the area, spawning in early August even late July in a hot year, and the bears are forced to forage for berries in autumn as most sockeye are decaying when the heavy frosts hit in late September.

As we made our way back to headquarters the smoky haze dropped in low over Port Alsworth; given the wind direction I was certain another fire had popped up following last night's storm. State fire crews and Park officials were hosting a public meeting that night to lay out the Park's plan for the summer fire season. Regardless of the plan I was pretty sure I knew what the public response would be—no more smoke. Guess I can't blame them, why live in a place like this if you can't see the mountains? Despite the reality of the situation that this summer's fire season was becoming the norm, the public remained indifferent or unwilling to adapt. Biologist tried to put a positive spin on the situation: "Just think of the moose habitat this will create in ten years." But that rationale fell on deaf ears. Many long time residents wanted to bring back the good ol' days when the Mulchatna caribou herd wandered through the park. But the Mulchatna herd resides mostly north of Bethel these days in the drying Y-K Delta area. I doubted Lake Clark would ever see caribou again as most of the park's tundra was shifting to a boreal forest ecosystem. Even in my short time in the park, the sockeye runs have undergone many changes. But, they still return every year, at least for now. When the salmon stop returning the people will take notice. I hope we're ready to deal with that possibility when the time comes. As I started pondering that scenario I couldn't help but count down my days to retirement.

Nested Scenario 2: Tiny Iceage/Is Anyone out there?

The Narrative:

Troy Hamon at KATM

Bear activity in southwest Alaska is still noteworthy in the year 2030, a remarkable piece of stability in the middle of a world that seems to be losing its grip on normal. The southwest coast of Alaska has been subject to a series of cooler and wetter years that defy the worldwide climate shift that has manifested itself through the loss of barrier islands on the Atlantic Coast of the nation, as well as a prolonged drought in the desert southwest. The apparent anomaly, due to local effects of a cooling phase in the Pacific Decadal Oscillation, has largely escaped notice because so many other things are going so wrong. But there are challenges here that are not getting a lot of attention. Bears are still easily seen along the salmon spawning grounds that consist of rivers connecting large lakes. But the tributary streams have been nearly abandoned, as their increasing frequency of floods and high water events have decimated many of those salmon spawning areas and made them difficult to fish. The ocean returns of salmon are down as well, but the persistent effort to market wild salmon against the farmed salmon industry has lost ground, and there is less market available, so commercial fishing effort has declined in tandem with the lower run sizes, and most fish processing facilities are barely hanging on. The stability of glaciers in this region, when most of the world has been reporting widespread loss of glaciers, is

noteworthy, and there are even some glaciers that are growing. Wildlife populations have been hit hard by the deep snow conditions accompanied by especially cold winters, but access to wildlife for local subsistence hunters has been improved by the ease of overland travel in the winters. The rising costs of fuel and the migration of rural residents to urban centers has minimized the demand for subsistence resources, however, and the reductions in wildlife have not been especially problematic for the agency. Local agency representatives find they are challenged to make local citizens and their home offices understand the sheer magnitude of change that likely awaits. When the cold phase of the PDO comes to an end, a transition to a warmer phase will likely result in a near catastrophic rearrangement of local ecosystems and physiography. Preparing the agency and the public has been the focus of a new education initiative, and the intention is to tag informational bulletins and twitter-based responses to climate pieces that mention local variability, oscillations, or ocean climate phases in order to keep the message of impending changes in the public eye.

Nested Scenario 3. Freeze Dried/Riots and Revolution

The Narrative:

An open letter to Senator Will Goforth, by the Peninsula, Alaska, Mayors Council. Published by the Alaska Daily News, July, 2030.

Dear Senator Goforth,

We the undersigned appreciate your many years of wise public service and support for Alaska's coastal communities. We are writing today to ask your help again in dealing with a crisis for which government agencies seem unable or unwilling to help our communities. You are well aware of the importance of community, place, and subsistence to rural Alaskans. While most of the people in our communities still live a subsistence lifestyle, it has become harder to subsist, and harder to maintain a viable community. After more than a decade of continually diminishing stream flows and sharply declining salmon returns, many local fishers have been forced to sell their salmon permits, their livelihood and their family legacy to out-of-state businesses. When our fish processing plant closed, more left to seek wage work elsewhere. We were devastated when enrollment dropped below the stated minimum enrollment, and we fear that since the school closed, there will soon be few younger people and families left in the community. With the prohibitively higher costs of fuel and electricity, we are thankful that some residents still have good paying jobs in government and community services, although the number of such positions has also declined with falling tax revenue. A few residents have also found jobs with new construction, wind farms, and mining operations on nearby state and corporation lands, but too many good jobs seem to be

filled by Outsiders. The federal and state agencies have compounded the challenges faced by our communities. For example, with the loss of our salmon resource, we have increasingly looked to hunters to provide for our aging residents. However, the decades-long drought, coupled with a history of water resources mismanagement, deforestation by wildland fires and mining impacts, and steadily increasing federal predator protection, has made it increasingly necessary for hunters to travel long distances to find harvestable wildlife. Agency regulators don't seem to appreciate that the changed landscape and unrealistic hunting seasons make access boat, foot, and snow machine unreliable. Now, those same agencies are working against our hunters, by denying use of ORVs to access to herds on government lands. Senator, we need the agencies to work with our public, not against us, and we desperately more good jobs in our rural communities before all our young families move away to hub communities and urban areas. Today, we are asking for your sponsorship for the "Salmon for our Children" bill, a program to fund construction and operation of an expanded network of government-funded community salmon hatcheries. We also ask for your support of a local-hire mandate, provisions for securing any necessary water rights from adjacent federal lands, and reasonable community access to federal lands by ORV in this bill.

Respectfully,

The Members of the Peninsula Mayors Council